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9 The diagram shows a shape made from a right-angled triangle and a semicircle.

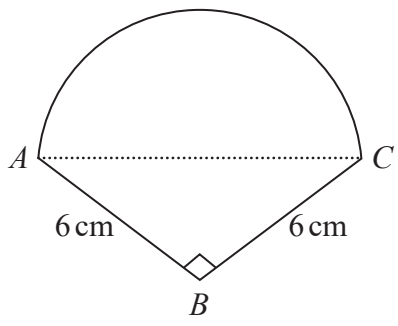


Diagram NOT accurately drawn

$AC$  is the diameter of the semicircle.  
 $BA = BC = 6$  cm  
Angle  $ABC = 90^\circ$

Work out the area of the shape.  
Give your answer correct to 1 decimal place.

..... cm<sup>2</sup>

(Total for Question 9 is 5 marks)



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10  $A = 2^n \times 3 \times 5^m$

Write  $8A$  as a product of powers of its prime factors.

.....  
(Total for Question 10 is 2 marks)

11  $C = b - a$

$a = 6$  correct to the nearest integer

$b = 15$  correct to the nearest 5

Work out the upper bound for the value of  $C$

Show your working clearly.

.....  
(Total for Question 11 is 3 marks)



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12 (a) Factorise  $2x^2 - 7x + 6$

.....  
(2)

(b) Solve  $\frac{4m + 9}{3} = 7 - 2m$

Show clear algebraic working.

$m =$  .....  
(4)

(c) Write  $\frac{\sqrt[4]{y}}{y}$  in the form  $y^b$  where  $b$  is a fraction.

.....  
(2)

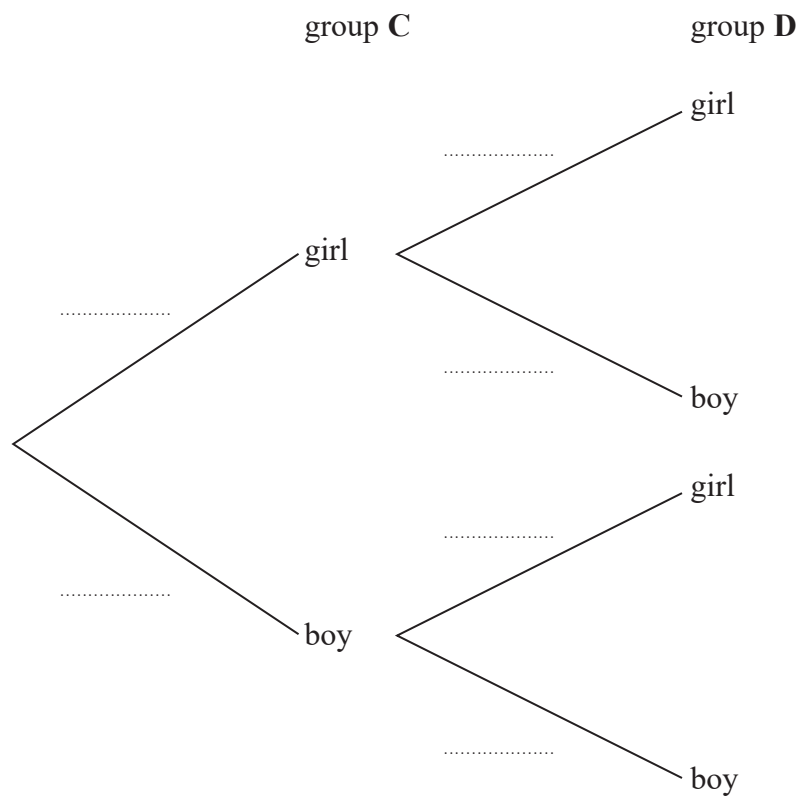
(Total for Question 12 is 8 marks)



13 In group C, there are 6 girls and 8 boys.  
In group D, there are 3 girls and 7 boys.

A team is made by picking at random one child from group C and one child from group D.

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that there are two boys in the team.

.....  
(2)



After the first team has been picked, a second team is picked.  
One child is picked at random from the children left in group **C** and one child is picked at random from the children left in group **D**.

- (c) Work out the probability that there are two boys in each of the two teams.

.....  
(3)

(Total for Question 13 is 7 marks)

- 14  $\mathcal{E} = \{\text{positive integers less than } 20\}$   
 $A = \{x : x < 12\}$   
 $B = \{x : 7 \leq x < 16\}$

- (a) List the members of  $A \cap B$

.....  
(2)

$C$  is a set such that  $C \subset A$  and  $n(C) = 3$

Given that all members of  $C$  are even numbers,

- (b) list the members of one possible set  $C$ .

.....  
(1)

(Total for Question 14 is 3 marks)



15 Use algebra to show that the recurring decimal  $0.2\dot{5}\dot{4} = \frac{14}{55}$

(Total for Question 15 is 2 marks)

16 Here are the first five terms of an arithmetic sequence.

7    10    13    16    19

Find the sum of the first 100 terms of this sequence.

(Total for Question 16 is 2 marks)

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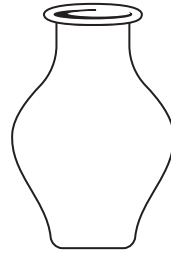
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17 A and B are two similar vases.



A



B

Diagram NOT accurately drawn

Vase A has height 24 cm.

Vase B has height 36 cm.

Vase A has a surface area of  $960 \text{ cm}^2$

(a) Work out the surface area of vase B.

.....  $\text{cm}^2$   
(2)

Vase B has a volume of  $V \text{ cm}^3$

(b) Find in terms of  $V$ , an expression for the volume, in  $\text{cm}^3$ , of vase A.

.....  $\text{cm}^3$   
(2)

(Total for Question 17 is 4 marks)

